

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
4 March 2004 (04.03.2004)

PCT

(10) International Publication Number  
**WO 2004/018095 A1**

(51) International Patent Classification<sup>7</sup>: **B01J 23/86**,  
23/26, C07C 17/20, 19/12

(21) International Application Number:  
PCT/US2003/026327

(22) International Filing Date: 21 August 2003 (21.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/405,221 22 August 2002 (22.08.2002) US

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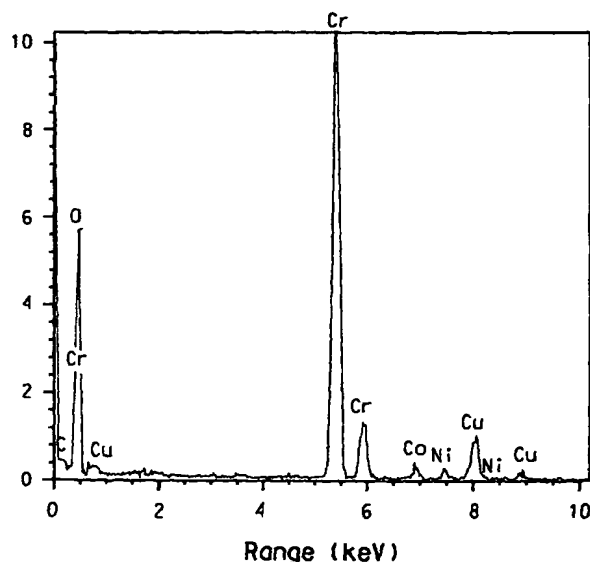
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(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,  
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

[Continued on next page]

(54) Title: NICKEL-SUBSTITUTED AND MIXED NICKEL-AND-COBALT-SUBSTITUTED CHROMIUM OXIDE COMPOSITIONS, THEIR PREPARATION, AND THEIR USE AS CATALYSTS AND CATALYST PRECURSORS



(57) Abstract: A crystalline alpha-chromium oxide where from about 0.05 atom % to about 2 atom % of the chromium atoms in the alpha-chromium oxide lattice are substituted by nickel atoms, and optionally, additional chromium atoms in the alpha-chromium oxide lattice are substituted by trivalent cobalt atoms (provided that the total amount of the nickel atoms and the trivalent cobalt atoms in the alpha-chromium oxide lattice is no more than 6 atom %) is disclosed. Also disclosed is a chromium-containing catalyst composition comprising as a chromium-containing component the crystalline substituted alpha-chromium oxide; and a method for preparing a composition comprising the crystalline substituted alpha-chromium oxide. The method comprises (a) co-precipitating a solid by adding ammonium hydroxide to an aqueous solution of a soluble divalent nickel salt, a soluble trivalent chromium salt, and optionally, a soluble divalent or trivalent cobalt salt, that contains at least three moles of nitrate per mole of chromium in the solution, has a nickel concentration of from about 0.05 mole % to about 2 mole % of the total of nickel, chromium, and cobalt in the solution, and has a combined concentration of nickel and cobalt of no more than 6 mole % of the total of nickel, chromium, and cobalt in the solution; and after at

least three moles of ammonium per mole of chromium has been added to the solution; (b) collecting the co-precipitated solid formed in (a); (c) drying the collected solid; and (d) calcining the dried solid. Also disclosed is a chromium-containing catalyst composition comprising a chromium-containing component prepared by treating said crystalline substituted alpha-chromium oxide with a fluorinating agent; and a process for changing the fluorine distribution (i.e., content and/or arrangement) in a hydrocarbon or halogenated hydrocarbon in the presence of a catalyst. The process involves using as the catalyst a composition comprising the crystalline substituted alpha-chromium oxide and/or the treated substituted alpha-chromium oxide.



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*